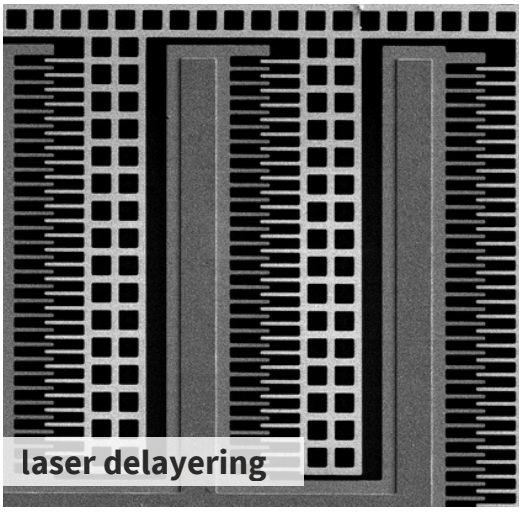
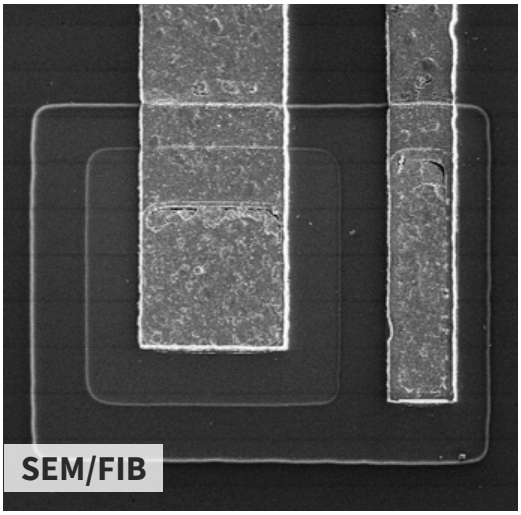
nanores lab

MICRO- AND NANO-COMPONENTS PRODUCTION

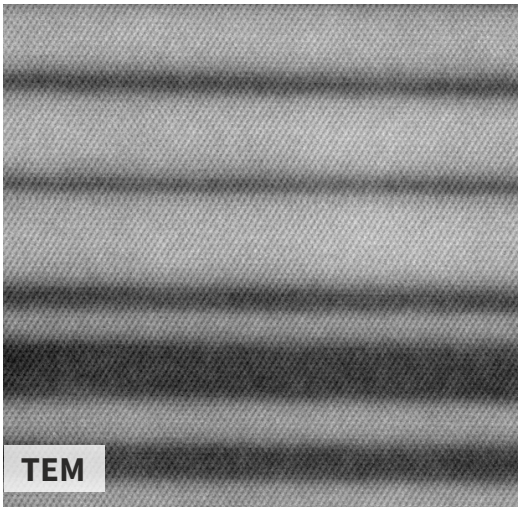
nanores lab



laser delayering



SEM/FIB



TEM

ABOUT:

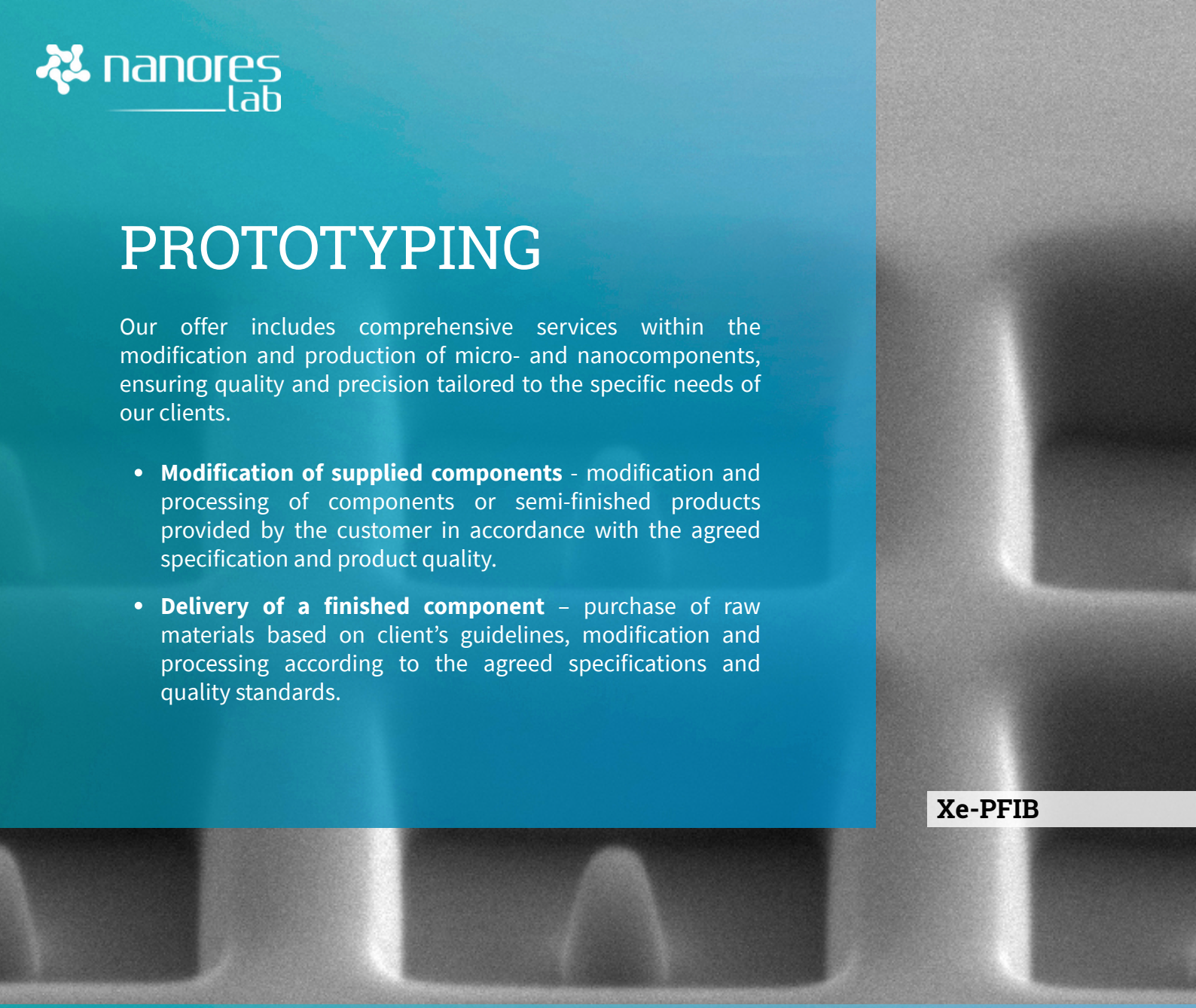
MICRO- AND NANOCOMPONENTS FABRICATION AND MODIFICATION

Our technological facilities allow for precise fabrication and modification of components on the micro and nano scale. We carry out both the creation of holes and channels, as well as complex structural modifications, processing various materials according to customer requirements.

PROTOTYPING

Our offer includes comprehensive services within the modification and production of micro- and nanocomponents, ensuring quality and precision tailored to the specific needs of our clients.

- **Modification of supplied components** - modification and processing of components or semi-finished products provided by the customer in accordance with the agreed specification and product quality.
- **Delivery of a finished component** – purchase of raw materials based on client's guidelines, modification and processing according to the agreed specifications and quality standards.



Xe-PFIB

Our equipment and expertise allow us to combine methods, utilizing both techniques to create more complex and demanding structures with different levels of component accuracy.

	Production volume	Minimal scale of modification	Workspace	Processing speed
Ga-FIB	low – high	1 nm – 10 nm – 100 nm – 1 µm – 10 µm	100 x 100 x 20 mm	low – very high
Xe-PFIB	low – high	1 nm – 10 nm – 100 nm – 1 µm – 10 µm	100 x 100 x 50 mm	low – very high
IR laser	low – high	1 nm – 10 nm – 100 nm – 1 µm – 10 µm	100 x 100 x 4 mm	low – very high
UV laser	low – high	1 nm – 10 nm – 100 nm – 1 µm – 10 µm	100 x 100 x 0.2 mm	low – very high

GA-FIB

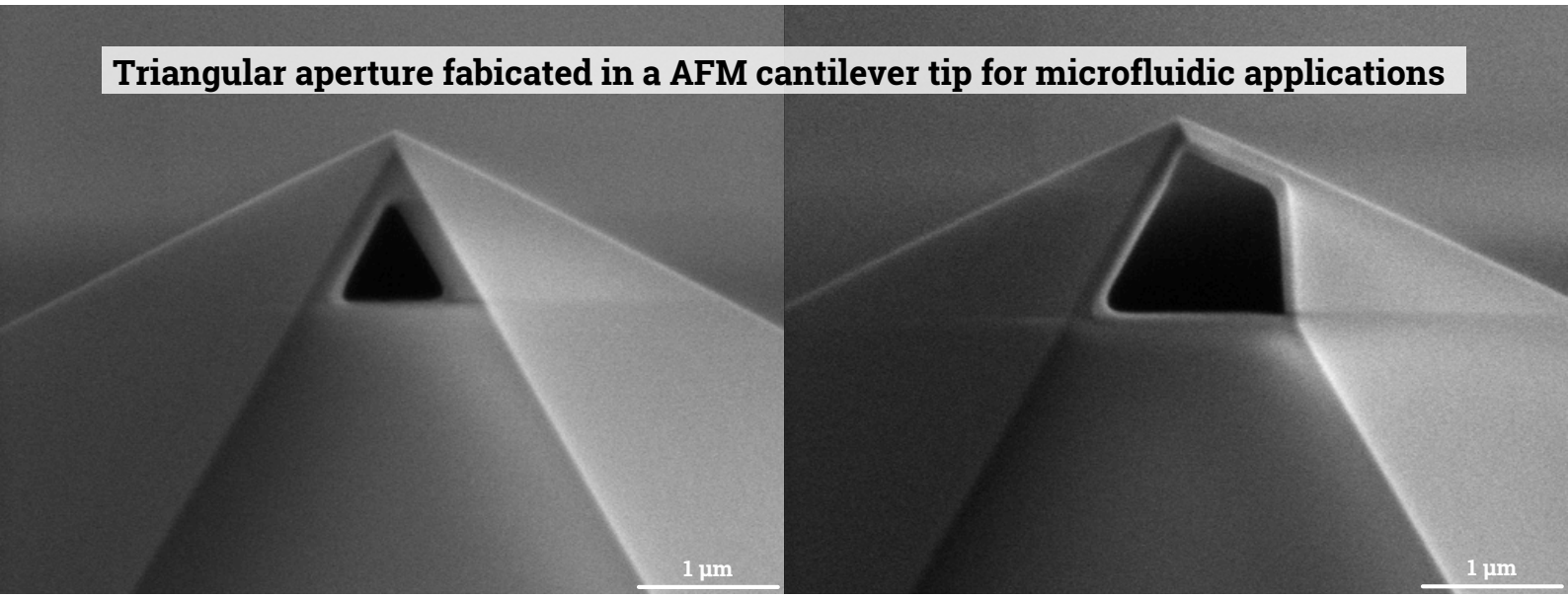
Focused Gallium Ion Beam (Ga-FIB) is an advanced technique that uses a focused ion beam for precise modification and fabrication of structures at the nanometric scale. Unlike traditional laser or mechanical processing, the FIB method allows for extremely controlled material removal or deposition with greater accuracy.

Ultra-high precision and resolution for fine milling and polishing — ideal for nanoscale features

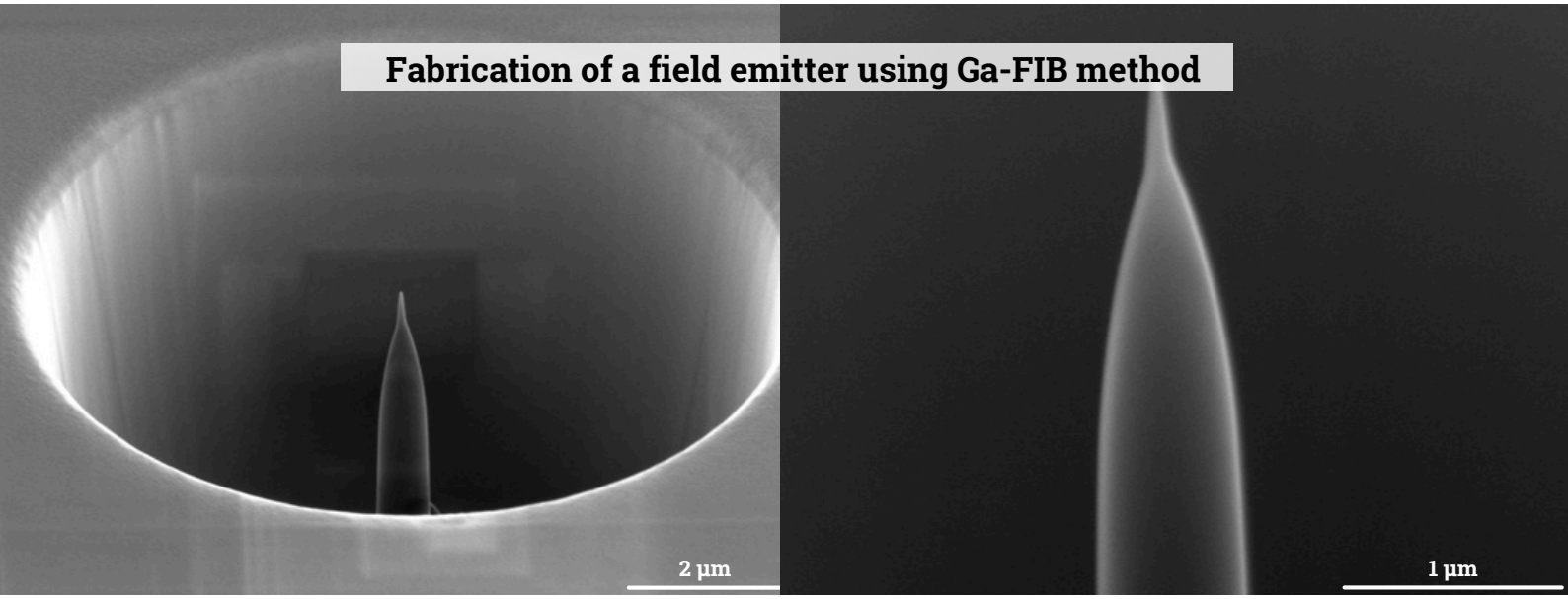
Optimized for small volumes: controlled, repeatable material removal with clean edges

Best when surface quality matters more than speed

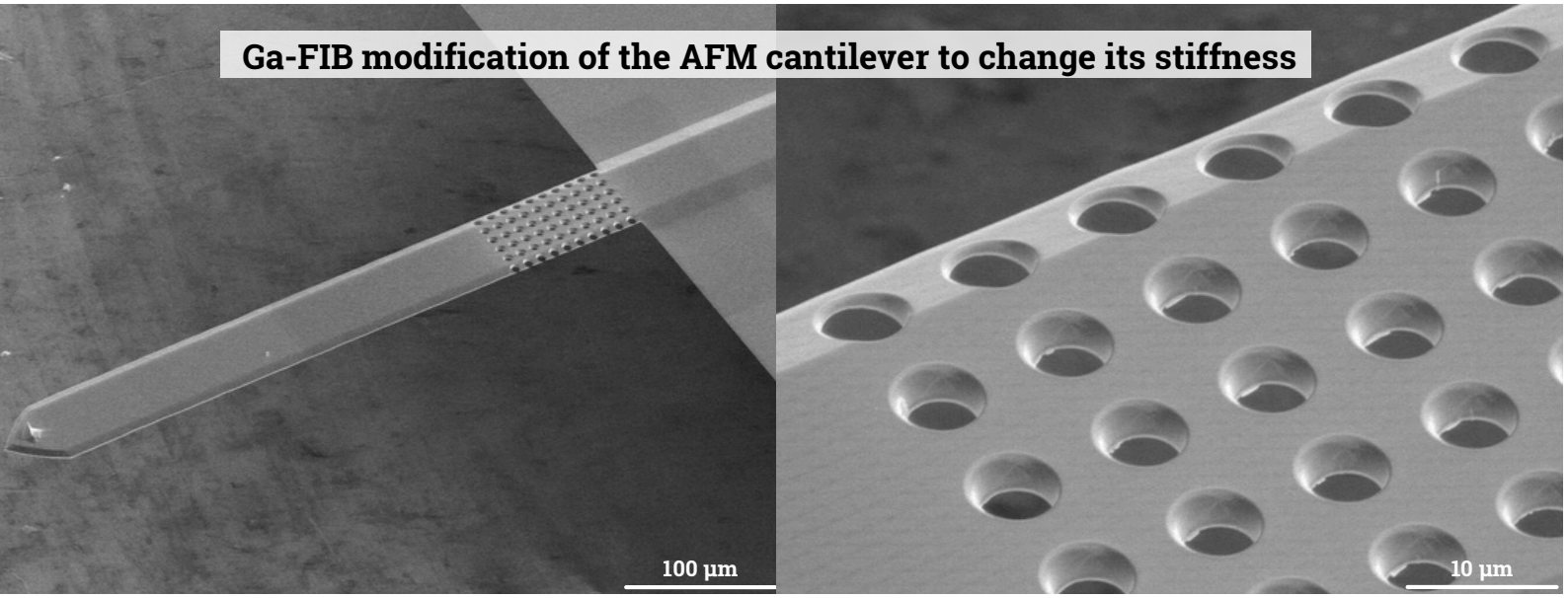
Triangular aperture fabicated in a AFM cantilever tip for microfluidic applications



Fabrication of a field emitter using Ga-FIB method



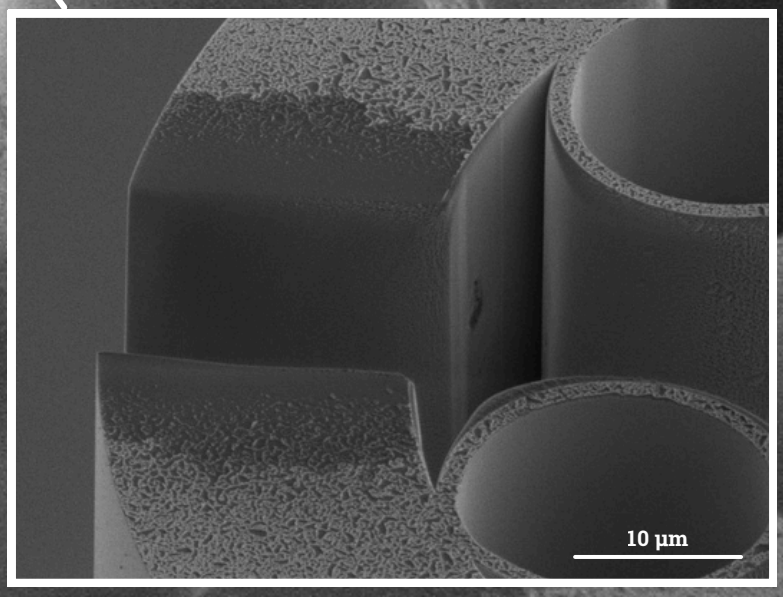
Ga-FIB modification of the AFM cantilever to change its stiffness



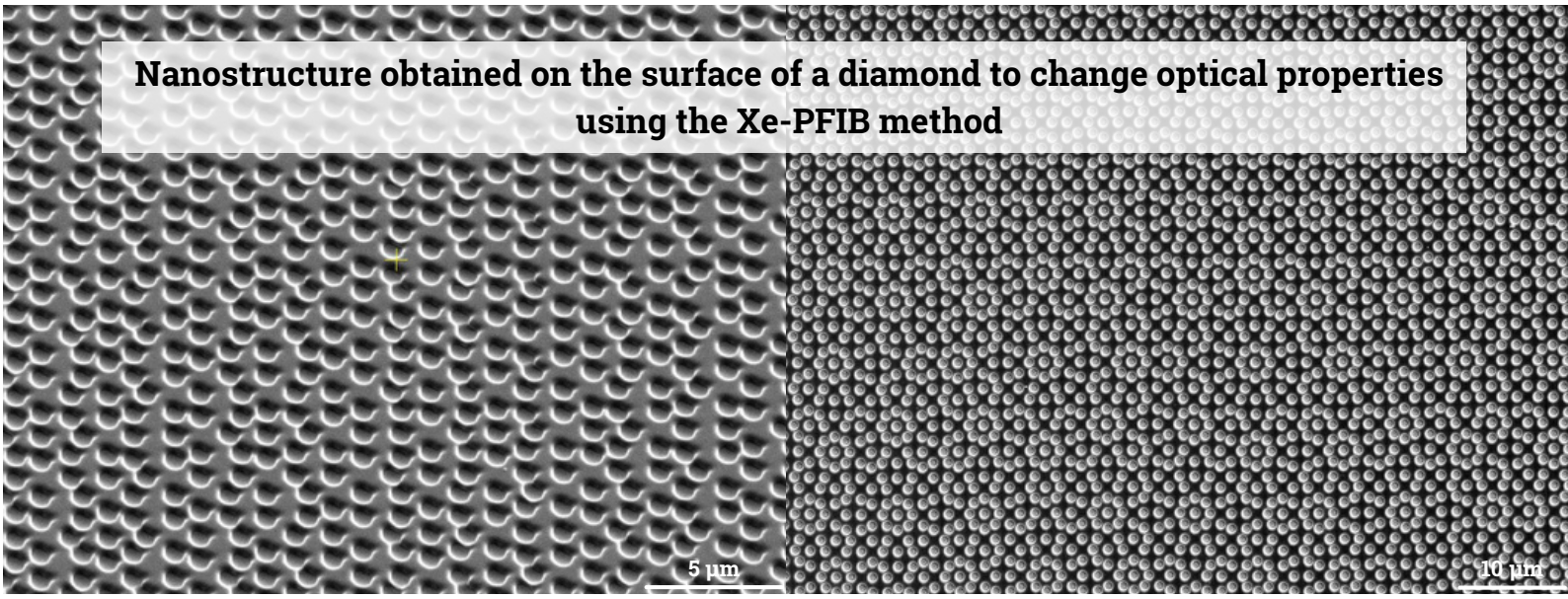
XE-PFIB

Focused Xenon Plasma Beam (Xe-PFIB) enables faster work with materials such as gallium or aluminum, as it prevents gallium ion implantation, avoiding changes in elemental composition and properties.

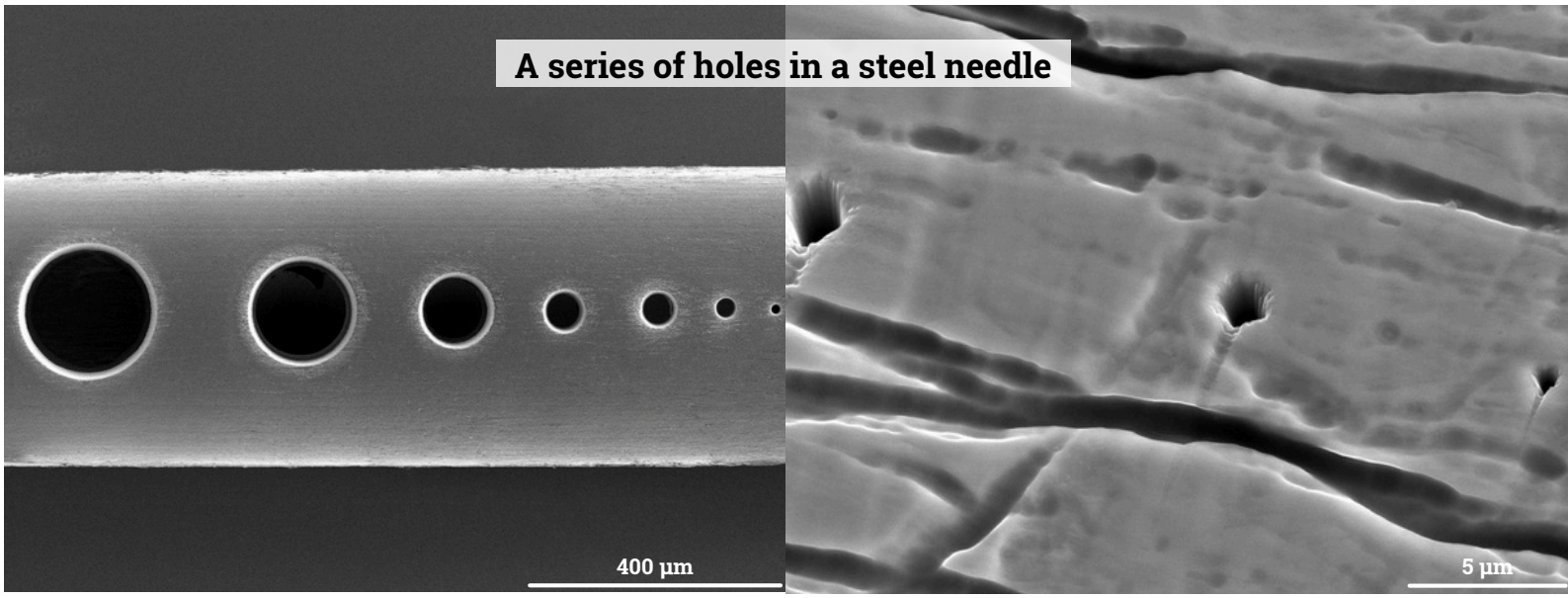
- Maximum throughput for rapid prototyping, with beam currents up to the microamp range
- Inert Xenon ions minimizes contamination risk compared with Ga ions, preserving material integrity
- Slightly larger spot size at high currents — unbeatable for bulk removal and pre-finish sample preperation
- Stitchless large-area patterning and high-throughput fabrication of uniform modification arrays



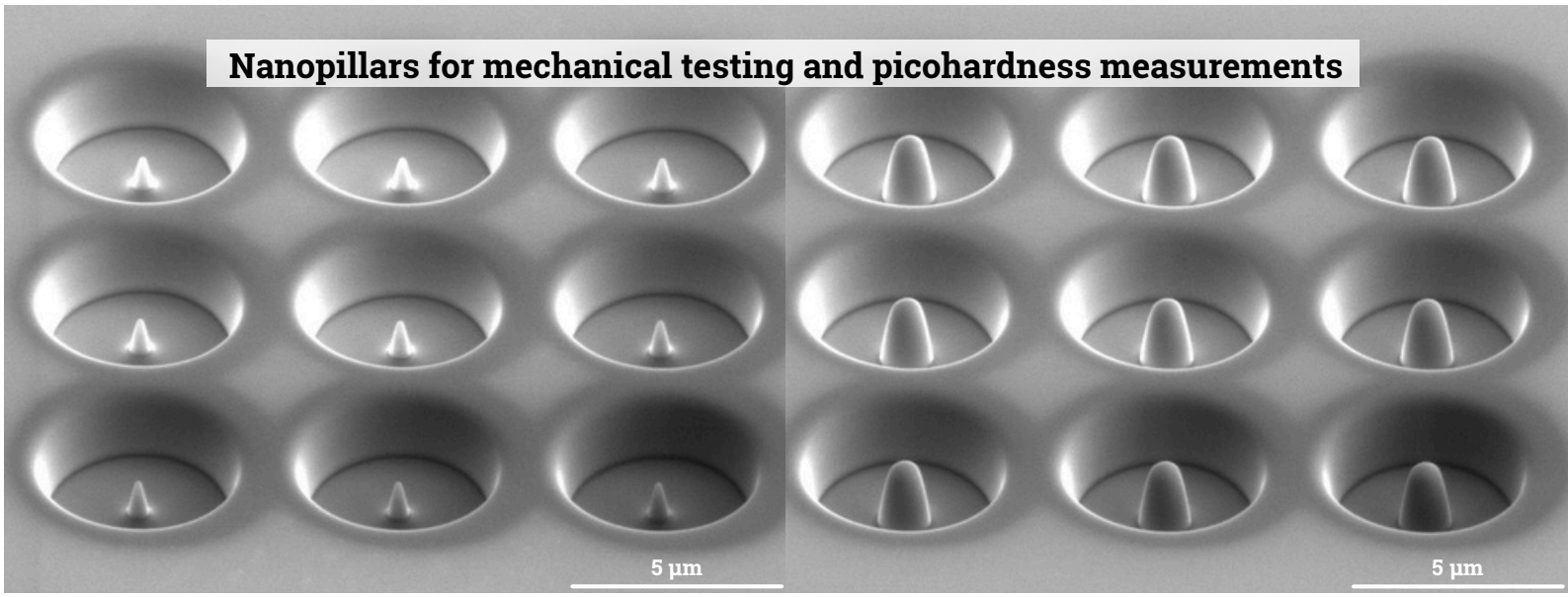
Hollow core fibre (HCF) modification made by the Xe-PFIB method



Nanostructure obtained on the surface of a diamond to change optical properties using the Xe-PFIB method



A series of holes in a steel needle

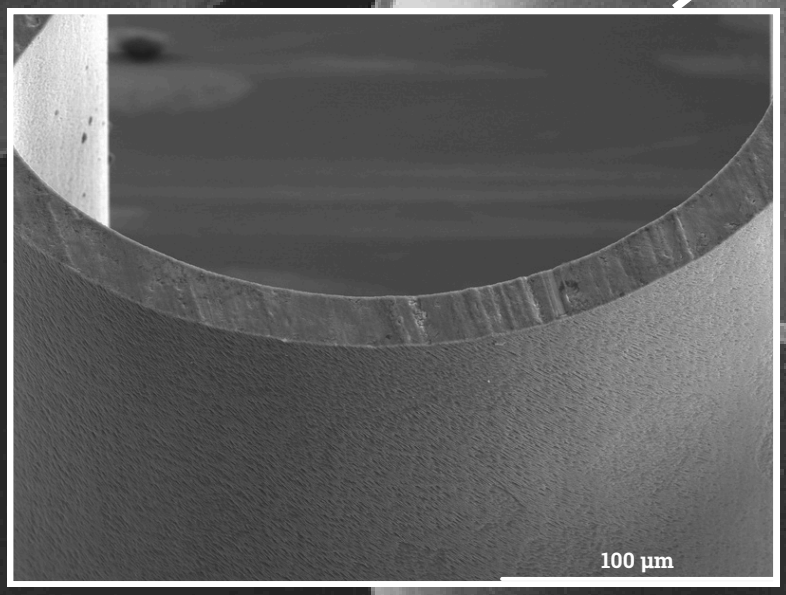


Nanopillars for mechanical testing and picohardness measurements

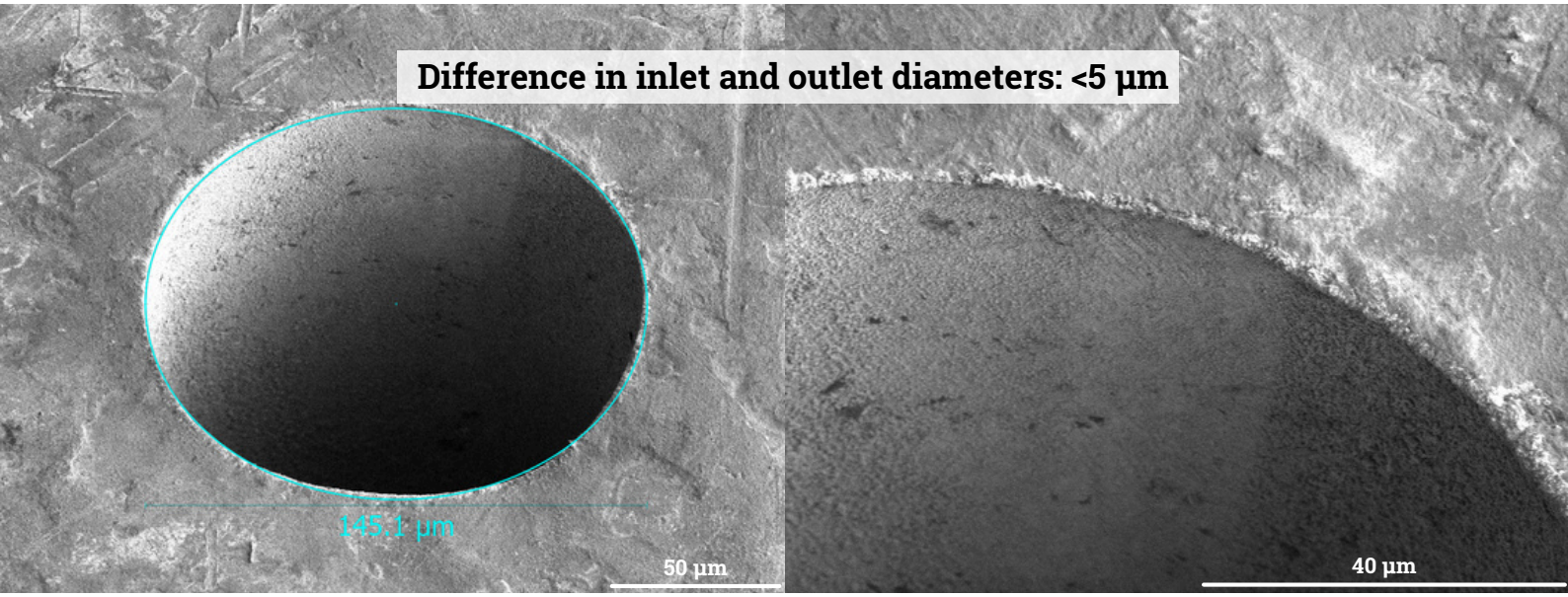
IR-LASER

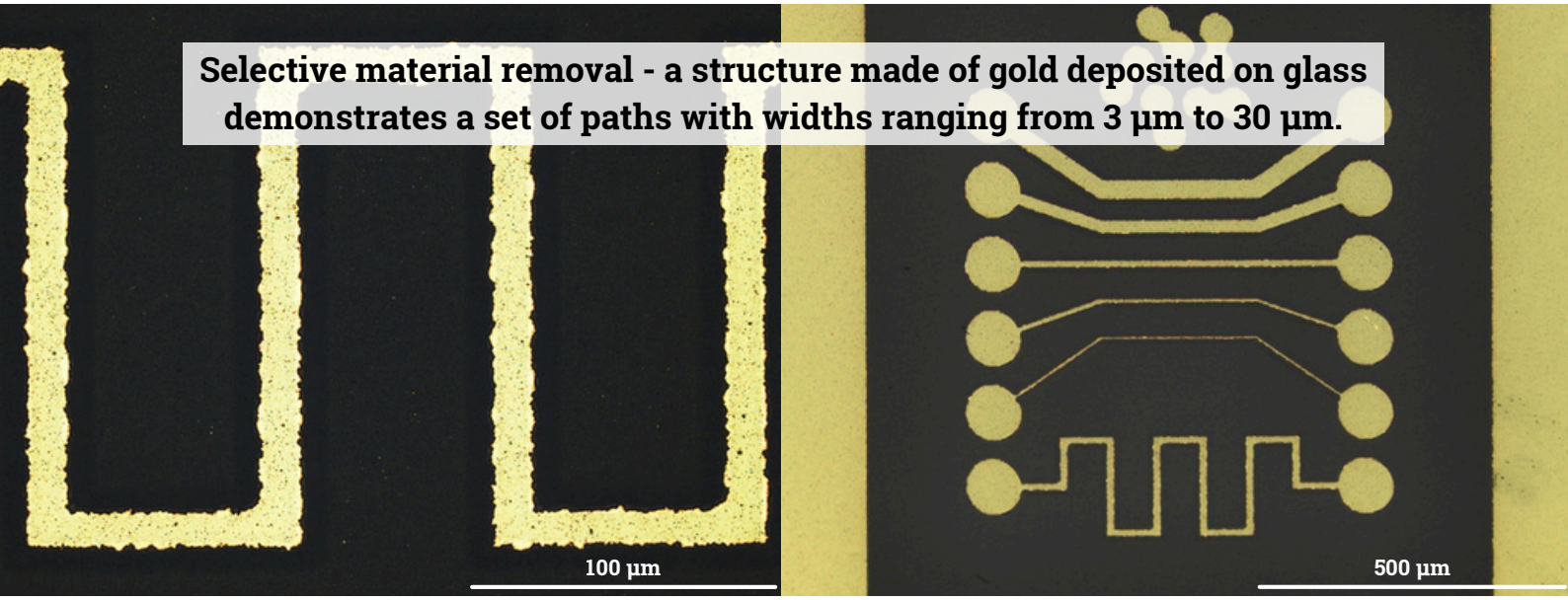
A femtosecond laser is an advanced ultrashort-pulse laser that emits light pulses lasting only a few hundred femtoseconds. Such short pulses allow for extremely precise material processing with minimal thermal impact.

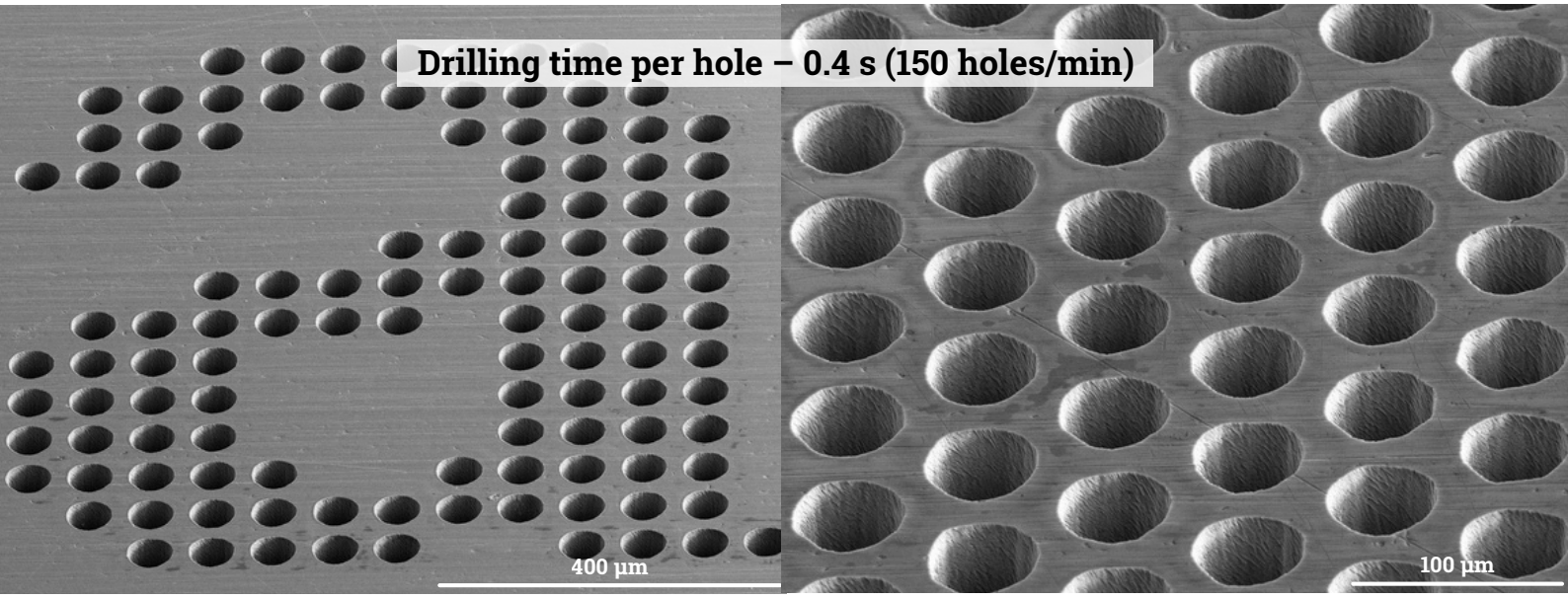
- Capability to process any solid material, removing it only where intended (layer-by-layer processing)
- 5-axis beam positioning (x, y, z, α, β), enabling the creation of complex geometries
- Ability to achieve vertical sidewalls with a maximum structure aspect ratio of 10:1



A structures with walls 10 µm thick. Material: Titanium

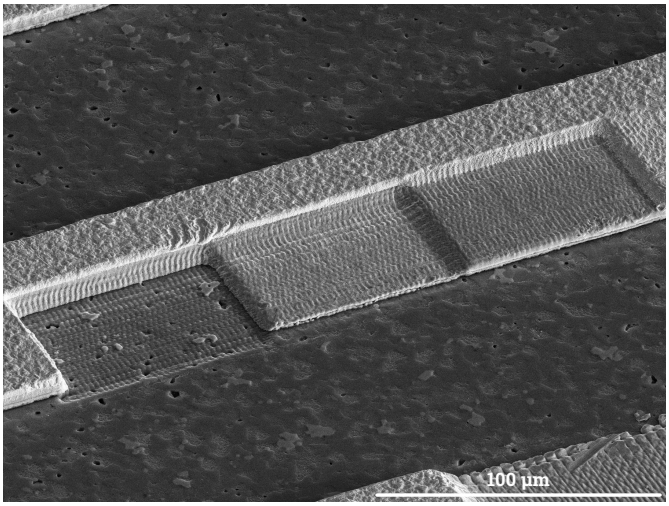

Difference in inlet and outlet diameters: <5 µm
145.1 µm
50 µm
40 µm

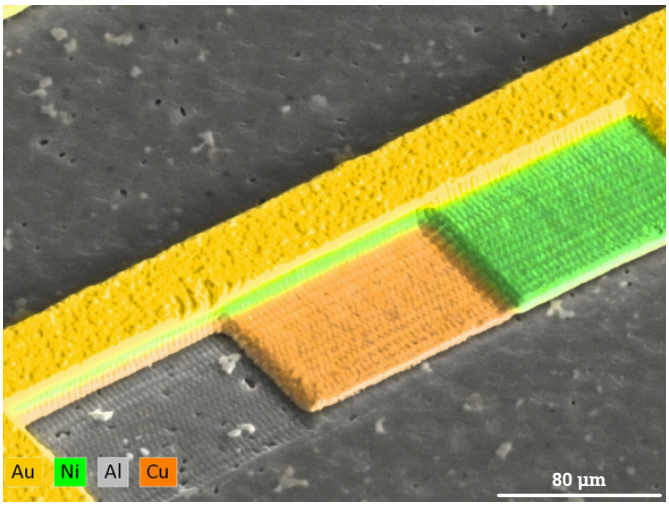

Selective material removal - a structure made of gold deposited on glass demonstrates a set of paths with widths ranging from 3 µm to 30 µm.
100 µm
500 µm

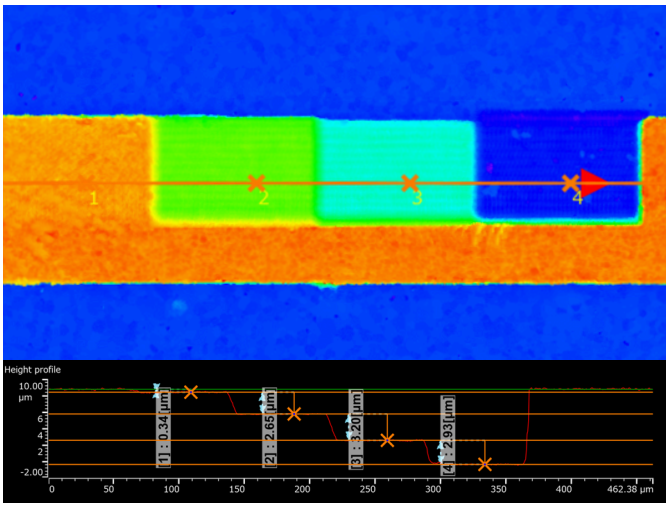

Drilling time per hole – 0.4 s (150 holes/min)
400 µm
100 µm

UV-LASER

- Capability to process any solid material, removing it only where intended (layer-by-layer processing)
- Minimum modification size of ~1 µm
- Processing accuracy <100 nm
- Capability for precision processing of optical materials while preserving surface quality







Multilayer metallic path composed of Au | Ni | Cu on an aluminium substrate with performed delayering process

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